

described above in Section 4.1.2 of this report. Roadways make up only a small portion of the acreage in basins investigated by the City, some of which is mostly residential and commercial with lower assumed potential for contaminant conveyance. Roadways that serve industrial and contaminated sites have a higher potential for conveying contaminants to the river through the storm sewer system. City programmatic and individual source control measures are applied to roadways and stormwater control components are regularly maintained by the Portland Bureau of Transportation. No areas of PBOT roadways with erodible banks were identified. Therefore, as described above, the potential for sediment recontamination and unacceptable risk to Willamette River receptors from PBOT roadways is considered low to medium until these or additional measures, as warranted, are demonstrated to be effective.

4.2.3 Railroads

Active rail lines, operated by Union Pacific Railroad, ~~Buckingham Northern Santa Fe Railroad~~ and Portland Terminal Railroad, are present on both sides of the Willamette River through Portland Harbor. DEQ rail related source control investigations and control efforts are focused on rail yards (e.g., Willbridge Rail Yard, Guilds Lake Rail Yard, UPRR Albina Rail Yard), rail support and maintenance facilities (e.g., former Hoyt Street Rail Yard and UPRR St. Johns Tank Farm) and spurs at sites throughout the study area uplands (e.g., Rivergate, T-4/International Slip, Swan Island/Mocks Bottom, T-2, RM 11E, Gunderson). Because PCBs and other Harbor-wide contaminants of concern were identified ~~in association with rail lines~~ in these investigations, it is anticipated that lines in some areas adjacent to surface water could be potential sources through the stormwater or bank erosion pathways. Five areas where additional evaluation may be warranted include: North Doane Lake; the rail bridge across the Willamette River at approximately river mile 6.9; the east riverfront from Triangle Park south to Mocks Bottom at approximately river mile 7.7 to 8.0E; the east riverfront along the north portion of Willamette Cove at approximately river mile ~~7.5E~~ **6.8E**; and the east riverfront at the Broadway Bridge and south from approximately river mile 11.6 to 11.9E. Given the small land area, lack of known releases, and lack of information on bank conditions and overland flow potential, DEQ designated further investigations as low priority and considers the potential for sediment recontamination and unacceptable risk to Willamette River receptors to be low. This data gap is acknowledged in Section 4.8.4 of this report, which details plans for filling it, as warranted.

4.3 Groundwater Plumes

In general, upland site characterization activities follow the CERCLA Preliminary Assessment, Site Investigation, Remedial Investigation process outlined in DEQ and EPA guidance. Upland investigations focus on determining if groundwater is impacted by site activities, and if groundwater impacts are present whether a contaminant plume may adversely impact the Willamette River. Figure 4.3 identifies sites evaluated by DEQ for groundwater impacts and the groundwater plumes characterized by these investigations.

4.4 Erodible Banks

Riverbanks at sites were evaluated following the JSCS to determine if they present a potential for contaminant transport to the Willamette River by erosion of bank soils or mass wasting. Bank areas of concern are depicted on geographic regions Figures 4.5.1 through 4.5.9, presented in Section 4.5 of this report. Per agreement with EPA, except for the few sites discussed in the geographic region sections, DEQ deferred the selection of riverbank source control measures, design, permitting and implementation to EPA. This allows for efficient integration of the riverbank source control measure design, permitting and construction with the in-water sediment remedial work.

4.5 Geographic Regions

The following section offers a summary of status and pathway details at each site that DEQ has evaluated for upland source control. DEQ divided the uplands surrounding the study area in nine distinct geographic regions

Centennial Mills (ECSI # 5136)

Centennial Mills is located on the west bank of the Willamette River at approximately RM 11.3 and encompasses 3.5 acres. The northern portion of the site contains a multi-story flour mill, formerly occupied by Centennial Mills, while the southern site contains an open horse paddock, corral, and surface parking. Currently, a portion of the former mill and paddock are used by the City of Portland Mounted Patrol Unit for horse stabling and related training. The earliest development on the site was in the late 1800s and included a ferry landing, a dock, and several buildings on piles over the shallow riverbank. The buildings were used for tannery, coal bunker, cold storage, ice factory and ferry landing operations. The mill complex was constructed between 1910 and 1930, with some buildings built on fill soils and others on piles over the river. In 1936, former buildings and the ferry landing were removed in the southeastern third of the site, leaving an embayment to the river. This area was filled by 1950 for use as the mill parking lot. The mill has had several owners, with Archer Daniels Midland. Milling being the last to own and operate the mill from 1981 until 2000. The Portland Development Commission purchased the property in 2000, remodeled a portion and built the current horse paddock. The remainder of the mill is vacant and the entire site is slated for redevelopment for commercial use and open space. Known contaminants on the site include metals, petroleum hydrocarbons, and hydrocarbon constituents in filled soil and localized groundwater, particularly in backfill around the Tanner Creek/storm sewer that runs below the site and discharges to the Willamette River. The contamination appears to be migration along the sewer pipe bed from the former Hoyt Street Railyards site and is being addressed as a separate action. As part of the mill site redevelopment, contaminated sewer backfill will be isolated with cutoff collars.

see deletion

which

from historic on-site USTs. or

Riverbank Erosion: The riverbank beneath the mill complex consists of a bulkhead, shallow beach, and a concrete wall, protected from erosion by foundation walls extending into the river and building piles that reduce wave action. Outside of the mill building, the riverbank is generally covered by riprap and vegetation that minimizes the potential for erosion. Analytical results from both the riverbank and shallow sediment adjoining the site do not show any significant contamination. Based on this information, erosion of upland and riverbank soil is considered insignificant and excluded as a pathway.

Stormwater and Overland flow: Centennial Mills contributed stormwater runoff to the river through 23 roof drains, up to 25 outfalls piped from paved areas (not all of which are currently active) and the active Tanner Creek Sewer outfall. At least two of the 12 outfalls depicted on Figure 4.5.2 have been abandoned. Modestly elevated concentrations of metals were detected in stormwater discharges, but not in river surface sediment immediately adjacent to the site and related outfalls. While additional controls for the existing condition are not warranted, redevelopment of the site under City of Portland Stormwater Manual is anticipated to address metals associated with existing metal roofing and chipping paint at the vacant areas of the site, completing control for the stormwater pathway.

Groundwater: TPH, PAHs, and metals have been detected in site groundwater monitoring wells at low concentrations. These contaminants appear to be associated with contaminated fill placed on-site during site development and minor site-related releases. Detected concentrations are below screening level values and DEQ Ambient Water Quality Criteria and are also generally considered to be of low mobility. Based on this information, site groundwater is considered insignificant and excluded as a source control pathway.

Sampling of backfill around the abandoned storm lines that cross under the site did not identify significant contamination. However, the potential for contamination in the sewer pipe bedding to reach the river will be addressed by a separate investigation and remediation of the adjacent site, known as the Tanner Creek project, anticipated to be complete in 2015. Until this work is completed, the preferential transport of groundwater pathway is considered uncontrolled. However, due to the

Sediment Areas of Potential Concern – During the Lower Willamette Group’s remedial investigation, EPA identified sediment areas of potential concern 18, 19 and 20 off shore along the Guilds Lake geographic region, as depicted on Figure 4.5.4. Contaminants found at elevated levels in these AOPC units were identified in a draft matrix in 2010, during the Lower Willamette Group’s remedial investigation process, as listed in Table 4.5.4-1 below. As the in-water feasibility study progressed, EPA refined AOPCs into draft Sediment Decision Units (EPA 2014) based on site-wide contaminants of concern. DEQ referred to the AOPCs and associated contaminants of interest in directing upland source control work and as a conservative line of evidence for recontamination evaluation.

Table 4.5.4-1 Guilds Lake Geographic Region Sediment Areas of Potential Concern and Elevated Contaminants of Interest	
AOPC	Contaminants of Interest
18	aluminum, barium, cadmium, copper, iron, manganese, mercury, silver, zinc, PCBs, PAHs, delta-HCCH, dieldrin, endrin, chloroethane
19	aluminum, barium, cadmium, copper, iron, manganese, mercury, silver, zinc, bis(2-ethylhexyl)phthalate, PCBs, PAHs, dioxins/furans, aldrin, delta-HCCH, dieldrin, endrin, DDx, chloroethane
20	cadmium, copper, lead, mercury, zinc, PAHs, PCBs, dioxins/furans, DDx,
(Source: 2/17/2010 draft AOPC Matrix LWG RI)	

Direct Discharge - While not all the outfalls depicted on Figure 4.5.4 are currently active, each was initially identified as a potential historical discharge point and all of the outfalls in this georegion discharge to one of the AOPCs: 18, 19 or 20. City of Portland MS-4 permitted stormwater outfalls 16, 17, 18, 19, and 19A drain portions of the Guilds Lake georegion to the Willamette River at the points shown on Figure 4.5.4. Discharge from these City outfalls is a mix of runoff from Forest Park and varying swaths of industrial areas. Detailed information about the basins and sites these City outfalls drain is available by outfall number in the appendices of City’s 2013 Municipal Stormwater Source Control Report for Portland Harbor. ODOT contributes MS-4 permitted runoff from Hwy 30 to City-owned outfalls 16, 17, 18 and 19. The Port of Portland also contributes MS-4 permitted runoff through two outfalls near Balch Creek Cove, located riverward and upstream of City outfall 16 on Figure 4.5.4, one of which discharges to AOPC 20. Up to 61 private outfalls also discharge stormwater along the west side bank between river miles 8 and 10.3, mostly from sites determined not to require source control evaluations. While not all outfalls are still active, discharges through many of these private outfalls are regulated under one NPDES Individual Wastewater permit, 17 sites assignments of the NPDES 1200Z or 1200A Industrial Stormwater General permits, and 45 sites that qualify for No Exposure Certifications under the general permits or apply best management practices like those required under permits, as listed in Table 4.5.4-2 below. Approximately 50% of the Guilds Lake georegion consists of Forest Park and residential areas that don’t require permits. Approximately 30% of the remaining land area has permits and management practices applied, as shown with purple striping on Figure 4.5.4.

Arc Energy

Table 4.5.4-2 Guilds Lake Geographic Region NPDES Permits				
Individual Permits		Industrial Stormwater General Permit Registrants		1200Z Industrial Stormwater General Permit – No Exposure Certifications or BMPs
	Permit #			
		CalPortland ReadyMix	1200A	
Univar USA Inc.	101613	Carson Oil Truck Shop	1200Z	Anderson Bros
		Carson Oil Warehouse	1200Z	Chavon Appliance
		Christenson Oil	1200Z	PGE Forest Park
		Container Management Services	1200Z	Anderson Portland Properties
		Equilon Enterprises, LLC	1200Z	Calbag Metals
		Esco Corporation (Plant #3)	1200Z	Oregon Beverage Recycling Cooperative
		Greenway Recycling	1200Z	GE Decommissioning

	Gunderson LLC	1200Z	Galvanizers
	McCracken Motor Freight Inc	1200Z	Paco Pumps
	Owens Corning Roofing and Asphalt LLC	1200Z	Port of Portland Terminal 2
	Pacific Rail Services	1200Z	Stevedoring Services Of America
	Peninsula Truck Lines, Inc	1200Z	Calbag Metals
	Portland Terminal RR Co	1200Z	Penske Truck Leasing
	Tube Forgings of America Inc	1200Z	SFI, Inc.
	Western Wire Works	1200Z	ABF Freight Systems Inc
	Wilhelm Trucking Co	1200Z	Alliance Trading LLC
	Arc Terminals	1200Z	Applied Industrial Technology
			Ashland Hercules Water Technologies
			Baxter & Flaming Industries
			Benson Industries
			Color Magic Inc
			Culver Glass Co Inc
			Documart Copies And Printing
			Dura Industries
			Electrical Distributing
			Fast Fabricators
			Flatline Fabrication
			Gans Ink & Supply Company
			Georgia-Pacific NW Service Ctr
			Industrial Craters & Packers
			Ink Systems Inc
			Kenan Advantage Group Inc
			P-Dinh
			Portland Bindery
			Portland Bolt & Manufacturing
			PPV Inc
			Premier Finishes Inc
			Pronto Distribution
			Rose City Bindery
			S & H Trucking
			Special Asphalt Products Inc
			Sterling Business Forms
			Tomra Company
			Tualatin Valley Transportation Inc
			Yeon Mini Storage
			Chevron Transportation
			Goby Walnut Products, Inc.

delete

Upland Sites Investigated – As depicted on Figure 4.5.4 and summarized in Table 4.5.4-3, DEQ evaluated 50 upland sites for source control in the Guilds Lake geographic region, while EPA led evaluation on an additional site, Vanwater and Rogers (Univar). Additional details are provided in the text that follows the table for sites with medium or high priority pathways and the EPA-led site.

Table 4.5.4-3 Guilds Lake Geographic Region Sites						
SITE	ECSI#	PATHWAY(S)	PRIORITY	SOURCE CONTROL MEASURES STATUS/DATES	DECISION DOCUMENT	RECONTAMINATION POTENTIAL
Anderson Bros	970	Overland flow Groundwater Stormwater	Low Low Low	Excluded Excluded Stormline cleanout/BMPs 2008	NFA 2007, 2009 SCD 2009	Low
Chevron Asphalt	1281	Groundwater Stormwater	Low Low	Excluded Stormline cleanout/BMPs 2009	SCD 2010	Low
Willbridge Railyard	3395	Groundwater	Low	Excluded	SCD	Low

See OSM on p. 81. Why not identical?

bank

Gunderson	1155	Overland flow Bank erosion Groundwater Stormwater Overwater acts	Low High Med xxxLow xxxLow	Addressed in stormwater evaluation Interim bank stabilization portion 2013/14 – SCMs needed portion to be integrated with in-water remedy Sparge /pump & treat 2007 – 2014 – effectiveness pending Stormline cleanout /paving/BMPs 2013/14 – effectiveness pending Excluded	SCD anticipated 2016	High until remedy implemented
Wirfs Property (Schnitzer Invest)	2424	Groundwater Stormwater	Low Low	Uncontrolled Uncontrolled	SCD anticipated 2015	Low
Wilhelm Trucking	69	Groundwater Stormwater	Low Med	Excluded New storm system/paving/BMPs 2013 - effectiveness pending	SCD anticipated 2015	Low
Container Management	4784	Groundwater Stormwater	Low Med	Excluded Geotextile fabric/gravel at catch basins/BMPs 2011 - additional SCMs needed - Uncontrolled	SCD anticipated 2016	Med
Columbia American Plating	29	Stormwater	Low	Stormline cleanout 2009,BMPs 2011	SCD 2014	Low
Carson Oil Co., Inc.	1405	Stormwater	Low	Stormline cleanout /BMPs 2012-2013 - effectiveness pending	SCD 2014	Low
General Electric Portland Inspection & Repair Service Center	4003	Groundwater Stormwater	Low Med	Excluded Stormline cleanout /BMPs 2007	SCD 2011	Low
Galvanizers Company	1196	Groundwater Stormwater	Med Med	Excavation 2001, Excluded BMPs/treatment 2007-2010 /diversion 2011	SCD anticipated 2015	Low
Paco Pumps	146	Stormwater	Low	Soil removal 1987 & 1997, Stormline cleanout /paving/BMPs 2007	NFA 2007 SCD 2007	Low
Port of Portland Terminal 2	2769	Overland flow Bank erosion Groundwater Stormwater Overwater acts	Low Low Low Low Low	Addressed in stormwater evaluation Excluded Excluded Soil removal 1998, Stormline cleanout/BMPs 2008 Excluded	SCD 2013	Low
Calbag Metals	5059	Groundwater Stormwater	Med Med	Excluded (NFA 2014) Stormline cleanout /paving/BMPs/treatment 2012 - effectiveness pending	SCD anticipated 2015	Low
Penske Truck Leasing	5055	Groundwater Stormwater	Low Low	Excluded Soil removal/paving/BMPs - excluded	NFA 2008	Low
Kittridge Distrib Ctr	2442	Groundwater Stormwater	Low Low	Excluded Excluded	NFA 2007	Low
Greenway Recycling	4655	Groundwater Stormwater	Low Low	Excluded Excluded	NFA 2009	Low
SFI, Inc.	5103	Groundwater Stormwater	Low Low	Excluded Soil removal 2008, Cleanout/BMPs 2009	SCD 2010	Low
Trumball Asphalt (Owens Corning Yeon)	1160	Groundwater Stormwater	Low Low	Uncontrolled, refused to enter VCP BMPs (1200Z) - effectiveness pending	NA	Low
Dura Industries Inc	111	Stormwater	Low	Excluded	NA	Low
Ashland Chemical (Hill Investment)	1076	Stormwater	Low	refused to enter VCP, BMPs (NEC)	NA	Low
Mt Hood Chemical (Color Magic)	1328	Groundwater	Low	Excluded	NFA 1995	Low
Longview City Laundry & Cleaners	1395	Groundwater Stormwater	Low Low	Excluded Excluded	NA	Low

Vanwater and Rogers (Univar) (ECSI #330)

The Univar site is located approximately 2,000 feet from the shore of the west side of the Willamette River at river mile 8.7. Vanwater and Rogers a subsidiary of Univar Corp. started as a chemical supply company in 1946. About 1974, the company expanded into recycling and distilling spent solvents. Documented spills at the site include releases of methylene chloride, trichloroethylene, toluene and caustics. When Vanwater and Rogers decided not to renew the hazardous waste storage permit in December 1985, soil and groundwater sampling was required as part of Resource Conservation and Recovery Act closure activities. The sampling, performed in the summer of 1987, found high levels of solvents in the soil and in the groundwater. Site cleanup is being overseen by the EPA RCRA Corrective Action Program. EPA issued a Record of Decision for the site in 2006.

Groundwater: The record of decision specified expansion of the existing soil vapor extraction system and expansion of the groundwater extraction and treatment system in the source area. The remediation system was subsequently expanded to include a LNAPL pilot test recovery system and DNAPL monitoring. Concurrent with the operation and management of the remediation system, an updated conceptual site model is in development which will support a reevaluation of source area remedial technologies and corrective action alternatives.

Stormwater: The record of decision requires an evaluation of the stormwater pathway to ensure that contaminants from the Univar facility have not been released to stormwater and have not reached the Willamette River. Characterization of stormwater and stormwater solids has not yet been completed, in alignment with DEQ's Guidance for Evaluating the Stormwater Pathway at Upland Sites, 2009, and source control measures have not been implemented or monitored for effectiveness. As such, the site stormwater is uncontrolled and without a plan and schedule for control. The lack of a plan for control and similarity of site contaminants with those found in sediment areas where stormwater discharges indicates that the potential for sediment recontamination remains medium.

Gunderson (ECSI # 1155)

Gunderson's predecessor, FMC

see deletions

The Gunderson site spans approximately 63 acres along on the west side of the Willamette River, from approximately river mile 8.5 to 9.2. Barge, ship, and rail car building has occurred on portions of the site since the mid-1900s. The land area was expanded when dredged material and other fill was placed into the river in the 1950s and 1960s. ~~Gunderson~~ purchased the upstream third of the site, referred to as Area 3, in ~~the~~ 1980~~s~~. Starting in the 1950s, Area 3 was used for ship demolition and later car shredding. The facility currently builds rail cars and barges. Remedial investigation began in 1994 and determined that upland and riverbank soil, groundwater and stormwater had been impacted by releases during pre and post-1980s operations. Source control contaminants of concern include: dioxins/furans, PAHs, PCBs, butyltins, metals and 1,1,1-trichloroethane.

Riverbank Erosion: DEQ determined that contaminant levels in riverbank soils require source control measures, which will be evaluated as an element of the upland feasibility study. Interim bank stabilization measures were implemented from the upstream end of the site downstream to the approximate location of City of Portland outfall 18, as depicted in figure 4.5.4, but additional or more permanent measures may be necessary. Until measures are implemented and demonstrated effective, sediment recontamination potential from bank erosion from this portion of the site is considered high. For the bank area upstream of City outfall 18, final measures will be determined in the forthcoming feasibility study and implemented in conjunction with the EPA in-water remedy, completing source control for this pathway.

Groundwater: The primary area of concern for groundwater was in the downstream third of the site, where a release of 1,1,1-trichloroethane to groundwater occurred. Active remediation began in 2007, using air sparging and soil vapor extraction at the source and a pump and treat system located downgradient of the release, landward of the riverbank. Based on an optimization evaluation and subsequent sampling, DEQ approved the shutdown of that combined remediation system in May 2014. Following additional groundwater sampling to verify that concentrations were remediated to below applicable screening levels, DEQ anticipates issuing a source control decision at the end of 2014. Given the behavior of 1,1,1-trichloroethane, sediment recontamination is unlikely to occur, even if concentrations remain above screening level values and the plume reaches the river. Therefore, recontamination potential due to groundwater at the site is low.

Stormwater and Overland flow: In 2012 and 2013, Gunderson implemented a series of best management practices, including: paving; mechanized vector sweeping; catch basin filters; containment of blast grit containment; and removal of sediments from storm lines, to improve stormwater quality. DEQ anticipates submittal of a revised stormwater source control evaluation with data demonstrating effective control of contaminants in stormwater and the site stormwater will continue to be managed under the 1200Z Industrial Stormwater general permit. DEQ considers the stormwater pathway controlled, pending effectiveness demonstration and adaptive management, and the potential for sediment recontamination is low.

and final outfitting of completed barges

Overwater acts: Work over water occurs in two areas at the Gunderson facility: the outfitting dock and the barge launch ways, below where ordinary high water occurs. Industrial activities on the outfitting dock include rail car decaling and transfer to barges for shipment. Because these activities have a minimal potential for spill, this pathway was excluded. Improved operational practices and physical containment measures are employed in launch way areas, as required through the source control process. These practices and measures include: shielding launch way welding areas, regular vector truck use and debris cleaning in launch way areas; removal of erodible soil from launch way areas and placement of rock and replaceable straw waddles to disrupt sheet flow and strain potential solids from runoff. Given these on-going and adaptive management measures employed for overwater activities, DEQ considers this pathway controlled and the potential for sediment recontamination and unacceptable risk to river receptors is low.

Wilhelm Trucking (ECSI #69)

The Wilhelm Trucking site is located approximately $\frac{3}{4}$ of a mile inland on the west side of the Willamette River at approximately river mile 9.3 and is approximately 6.85 acres. The site consist of three tax lots separated by a rail line and currently used for a transportation terminal, equipment storage, parking, and a custom crate/packing shop. On the westernmost parcel, furnaces were used from 1930 to 1967 to melt lead from bearings. The source control investigation determined that site releases impacted site soils and stormwater. Hazardous substances associated with site activities include metals, petroleum hydrocarbons, PAHs and PCBs.

Stormwater: DEQ determined that contaminant levels in site surface soils and stormwater discharging to the Willamette River require source control measures. In 2013, failing parts of the stormwater system were removed and several two-chamber catch basins and an oil/water separator unit were installed. Also in 2013, the central and western portions of the site were repaved. Regular sweeping and other best management practices are employed on the site to improve stormwater quality, which is managed under a 1200Z Industrial Stormwater general permit. DEQ anticipates on-going monitoring to demonstrate effectiveness or that additional measures will be adaptively applied, as warranted. DEQ

Overland flow: Stormwater at the site is observed to readily percolate into sandy site soils and does not runoff to the river, so this pathway was excluded.

Bank Erosion: The Willamette Cove riverbank is subject to erosion in beach areas, oversteepened areas, and where revetment materials are failing. Riverbank soil samples have been collected above and below the mean high water line and indicate that metals, dioxin/furan, petroleum and PCBs are present in certain areas and will require remediation. Oversteepened bank areas will be laid-back during forthcoming uplands remediation work to minimize future erosion potential and additional bank remediation will be integrated into the in-water remedy, completing source control for this pathway.

Groundwater: Arsenic and PAHs were detected moderately above screening level values. Arsenic concentrations are within the range of concentrations in groundwater within the Willamette Basin and do not exceed EPA's preliminary remediation goals for sediment. PAH concentrations showed a strong decreasing trend from the first sampling event to the last and average concentrations of individual PAHs were less than 1 µg/L with the exception of naphthalene. Naphthalene was at or below the detection limit in two of the three west parcel wells and generally does not exceed screening levels in adjacent river sediment. DEQ anticipates issuing a source control decision in 2015 with no source control measures required for the groundwater pathway.

Stormwater: No stormwater conveyances or outfalls drain the upland site to the river, so this pathway was excluded.

Overwater acts: While historical docks allowed extensive overwater activities at the site, which may have contributed to contamination on the site and of shore, all overwater activities ceased by the early 1980s and remnant overwater structures were removed in the 1990s and the site is currently vacant. Therefore, the overwater acts pathway was excluded.

Kinder Morgan Cochin

Triangle Park (University of Portland River Campus) (ECI # 277)

The University of Portland River Campus (formerly Triangle Park) is located on the east bank of the Willamette River at river mile 7.5. The site covers approximately 35-acres and shares its northwestern property line with the McCormick & Baxter site. The Union Pacific Railroad line and right-of-way bisect the site, running northwest to southeast. An underground fuel pipeline and valve owned by ~~Chenex~~ are located on the site, near the south corner. Industrial uses on the site date back to the early-1900s and included lumber operations, shipbuilding, drydock operations, electrical power generation, manufacturing, ironworks, storage, electrical equipment repair, concrete batching operations, asphalt storage and environmental response and cleanup activities such as regulated hazardous waste storage and transformer cleaning and storage. The site was owned by Triangle Park, LLC between 1997 and 2008, which completed a remedial investigation and feasibility study under DEQ oversight in 2004. Hazardous substances detected in upland soil and groundwater included TPH, PAHs, VOCs, metals, and PCBs (soil only). DEQ issued a record of decision in 2005 that required soil removal and capping.

In 2008 the University of Portland acquired the property pursuant to a 2006 DEQ Prospective Purchaser Agreement Consent Judgment and a 2006 Bona Fide Prospective Purchaser's Agreement and Order with EPA. Further site investigations and an Engineering Evaluation and Cost Analysis were required by EPA to support selection of final removal actions for the site. The University completed soil excavation, regrading, capping, and riverbank revegetation in 2012 and 2013 and recorded a DEQ and EPA-approved Easement and Equitable Servitudes in 2014 that prohibits residential and agricultural food production use and requires cap maintenance, proper excavated soil handling and shallow groundwater monitoring for at least six years to assure the continued effectiveness of the removal action. Based on completion of the removal action work, upland source

	naphthalene, phenanthrene, pyrene, carbazole, dibenzofuran, phenol, PCBs, delta-HCCH, DDx, endrin, 1,1-dichloroethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, cis-1,2 dichloroethane, cyanide, ethylbenzene, isopropylbenzene, xylenes, toluene, trichloroethane, carbon disulfide, gasoline range hydrocarbons
9B (D)	aluminum, barium, cobalt, copper, iron, lead, manganese, mercury, nickel, vanadium, zinc, PAHs, 2-methylnaphthalene, acenaphthene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, carbazole, dibenzofuran, phenol, PCBs, delta-HCCH, DDx, 1,1-dichloroethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, cis-1,2-dichloroethane, cyanide, ethylbenzene, isopropylbenzene, xylenes, toluene, trichloroethane, carbon disulfide, gasoline range hydrocarbons
14	aluminum, barium, beryllium, cadmium, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, sodium, zinc, PAHs, naphthalene, 1,2-dichlorobenzene, 1,4-dichlorobenzene, phenol, PCBs, dioxins/furans, DDx, delta-HCCH, dieldrin, endrin, chlorobenzene, chloroform, carbon disulfide, perchlorate
16	aluminum, barium, beryllium, cadmium, copper, iron, manganese, mercury, zinc, PAHs, benz(a)anthracene, benzo(a)pyrene, phenol, PCBs, DDx, gasoline range hydrocarbons
18	aluminum, barium, cadmium, copper, iron, manganese, mercury, silver, zinc, PCBs, PAHs, delta-HCCH, dieldrin, endrin, chloroethane
(Source: 2/17/2010 draft AOPC Matrix LWG RI)	

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see deletions

(between the Chevron and Phillips 66 docks),

Direct Discharges – While not all the outfalls depicted on Figure 4.5.6 are active, each was initially identified as a potential historical discharge point. City of Portland MS-4 permitted stormwater outfalls 22, 22B & 22C drain portions of the Doane Lake/Willbridge georegion into the Willbridge Cove and on either side of the railroad bridge along the west side of the river. Outfall 22 discharges to AOPC 16 and outfalls 22B and 22C discharge to AOPC 14. Detailed information about the basins and sites the City outfalls drain is available by outfall number in the appendices of City's 2013 Municipal Stormwater Source Control Report for Portland Harbor. ODOT contributes MS-4 permitted runoff from Hwy 30 to these City-owned outfalls as well as to outfalls 22A at Salmon Creek, WR-205, WR-206, and WR-207 southeast of the west end of St Johns Bridge. Because ODOT does not own these outfalls, they are not labeled on Figure 4.5.6, but are indicated as ODOT-contribution. OF 22A discharges to AOPC 16 and WR-205, WR-206, and WR-207 discharge to AOPC 9D. The Port of Portland also contributes MS-4 permitted runoff to outfall 22 at Willbridge cove. Up to 34 private outfalls also discharge stormwater along the west side bank between river miles 6 and 8, mostly from sites undergoing source control evaluations, though many of these have been confirmed not to discharge. Eighteen of these private outfalls are depicted on Figure 4.5.6 at the EPA-led US Moorings site, without certainty as to their discharge status. All but one outfall depicted at the Arkema site were abandoned or confirmed as inactive. Discharges through many of the remaining active private outfalls in this georegion are permitted under five NPDES Individual Wastewater permits (some include stormwater), ten assignments of the NPDES 1200Z Industrial Stormwater General permit and two sites that qualify for No Exposure Certifications under the permit, as listed in the table below. Approximately 50% of the Doane Lake/Willbridge georegion consists of Forest Park and residential land, which does not require permits. Permits and management practices are applied at nearly 100% of the industrial land, as shown with purple striping on Figure 4.5.6.

Table 4.5.6-2 Doane Lake/Willbridge Geographic Region NPDES Permits			
Individual Permits		1200Z Industrial Stormwater General Permit Registrants, No Exposure Certification or Best Management Practices	
	Permit #		Permit #
NW Natural	103061	Air Liquide American Specialty Gases	1200Z
Star Link Logistics, Inc (Rhône Poulenc)	101180	Metro Waste transfer Station	1200Z
Koppers	101642	GS Roofing Products Company (CertainTeed)	1200Z
Siltronic	101128	Siltronic	1200Z
Arkema	100752	Brenntag Pacific, Inc	1200Z
Arkema	103075	Arc Terminals	1200Z
		McCall Oil Company Marine Terminal	1200Z
		Chevron USA – Willbridge Distribution	1200Z
		Phillips 66 Company (Willbridge Terminal)	1200Z
		Kinder Morgan Liquid Terminals, LLC (Willbridge Terminal)	1200Z
		US Moorings	1200Z
		Chevron Transportation	NEC
		Goby Walnut Products, Inc.	NEC

2005

EPA Early Actions – EPA entered into Administrative Orders on Consent with Arkema in 2007 and NW Natural (Gasco)/Siltronic in 2009 to conduct non-time-critical in-water removals, anticipated to be implemented expeditiously following the in-water record of decision. The Arkema and NW Natural (Gasco)/Siltronic early action areas are shown on Figure 4.5.6. Effective early implementation of upland source control measures are needed at the EPA early action sites to ensure that the in-water actions can be implemented on schedule. Details of the upland source control measures implemented and planned are presented below.

How will "in-water" remedy control upland sources?

Upland Sites Investigated – As depicted on Figure 4.5.6 and summarized in Table 4.5.6-3, DEQ evaluated 18 upland sites for source control in the Doane Lake/Willbridge geographic region, while EPA led evaluation on two additional sites, US Moorings and Gould Electronics. Additional details are provided in the text that follows the table for sites with medium or high priority pathways and EPA-led sites.

Table 4.5.6-3 Doane Lake/Willbridge Geographic Region Sites						
SITE	ECSI#	PATHWAY(S)	PRIORITY	SOURCE CONTROL MEASURES STATUS/DATES	DECISION DOCUMENT	RECONTAMINATION POTENTIAL
US Moorings	1641	Overland flow Bank erosion Groundwater Stormwater Overwater acts	NA	Vegetated buffer selected Monitoring selected Monitoring selected w/ SCMs planning on Gasco site NPDES 1200Z implementation	EPA-led	High until in-water remedy implemented at Gasco
NW Natural - "Gasco" Site	84	Overland flow Bank erosion Groundwater Stormwater Overwater acts	Low High High Low Low	SCMs needed – integrate w/in-water SCMs needed – integrate w/in-water Alluvium portion containment 2015 - effectiveness pending Fill portion - Uncontrolled Uncontrolled – to be addressed in upland remedy Spill plan & BMPs	SCD anticipated 2016	High until in-water fill portion upland remedies implemented
Koppers Inc	2348	Stormwater Groundwater	Low High	Excluded (discharges to POTW) – once 2 catch basins abandoned Being addressed by Gasco	NA	Low
Siltronic Corporation	183	Overland flow Bank erosion Groundwater	Low Low High	Addressed in stormwater evaluation SCMs needed – integrate w/in-water In-situ treatment 2009, Containment 2015 - effectiveness pending, Fill	SCD anticipated 2016	High until fill portion upland remedy implemented

See p. 57

SCMs needed - integrate with in-water

		Stormwater	Low	portion - XXXXXX 1200Z permit & BMPs - effectiveness pending		
		Overwater acts	Low	XXXXXX		
Rhone Poulenc	155	Bank erosion Groundwater	High Med	SCMs needed – integrate w/in-water OF 22B pipe re-lining 2012, uncontrolled	SCD anticipated 2016	Medium
		Stormwater	Med	Uncontrolled		
Arkema	398	Overland flow Bank erosion Groundwater	Med High High Medium	Addressed in stormwater evaluation SCMs needed – integrate w/in-water Containment 2014, portion uncontrolled	SCD anticipated 2016	High until in-water remedy implemented
		Stormwater	Med	Soil removal & cap 2000, additional cap & treatment 2012		
		Overwater acts	Low	Excluded		
Metro Central Transfer Station	1398	Groundwater Stormwater	Low Med	Excluded SCMs & BMPs 2000 – 2015 – effectiveness pending	SCD 2014	Low
Schnitzer Invest. Doane Lake	395	Groundwater Stormwater	Low Med	Excluded Cap to control stormwater runoff 2014 - effectiveness pending	SCD 2014	Low
Air Liquide	395	Stormwater	Low	SCMs & BMPs 2012 & 2013	SCD 2014	Low
CertainTeed Roofing (GS Roofing, Former Bird)	117	Overland flow Bank erosion Groundwater Stormwater Overwater acts	Low Med Med Med Low	Excluded Confirm during in-water remedy design if SCM needed Uncontrolled 1200Z permit, stormline cleanout 2013, BMPs - effectiveness pending Excluded	SCD anticipated 2015	Medium
Gould Electronics, Inc aka GA-TEK	49	Groundwater Stormwater	Low Low	Excluded Excluded	EPA-led	Low
Kinder Morgan (Willbridge Terminals)	1549 (160)	Overland flow Bank erosion Groundwater Stormwater Overwater acts	Low Low Med Low Low	Addressed in stormwater and bank erosion evaluations Excluded Saltzman Cr. Flume repairs 2007/2009 - effectiveness pending 1200Z BMPs - effectiveness pending Spill plan & BMPs	SCD anticipated 2015	Low
Chevron (Willbridge Terminals)	1549 (25)	Overland flow Bank erosion Groundwater Stormwater Overwater acts	Low Low High Low Low	Addressed in stormwater and bank erosion evaluations Excluded Removal/containment 2006-2008 OF22 repairs 2009 - effectiveness pending Spill plan & BMPs	SCD anticipated 2015	Low
Conoco Phillips (Willbridge Terminals)	1549 (177)	Overland flow Bank erosion Groundwater Stormwater Overwater acts	Low Low High Low Low	Addressed in stormwater and bank erosion evaluations Excluded Removal/containment 2001 On-site repairs 2006, OF22 repairs 2009 - effectiveness pending Spill plan & BMPs	SCD anticipated 2015	Low
McCall Oil	134	Overland flow Bank erosion Groundwater Stormwater Overwater acts	Low Low Med Med Low	Addressed in stormwater evaluation Excluded Excavation 1992 SCMs & BMPs 2012 & 2013 Spill plan	SCD 2014	Low
Santa Fe Pacific	2104	Groundwater	Low	Soil vapor extraction 2004-14 -	SCD	Low

Pipelines (Kinder Morgan)		Stormwater	Low	effectiveness pending Anticipated to be excluded	anticipated 2015	
Jinkz Corp (V&K Service)	2423	Stormwater	Low	Excluded	NA	Low
ECSO \ Willbridge Landfill	397	Stormwater	Low	Excluded - Landfill closed and capped in 1983	NA	Low

US Moorings (ECSI # 1641)

EPA led the remedial investigation and feasibility study for this site, which is owned and operated by the US Army Corps of Engineers since 1903 to support river dredging, hydro survey and support vessels (USACE 2012). Review of the remedial investigation and feasibility study documents indicate that evaluation of erodible soils and banks, groundwater, stormwater and in-water sediment was undertaken at the site and that the remedy selected included a vegetated buffer along part of the bank, groundwater and erodible soils monitoring, and continued implementation of the 1200Z Industrial Stormwater General permit. Documentation of remedy implementation was not available to DEQ at the time of this report.

The available information on the site investigation indicates that the stormwater pathway was not adequately characterized throughout the site and the potential for groundwater infiltration to the preferential pathways of underground utility lines traversing the site was not evaluated. In addition, uncertainty remains as the activity of the 18 outfalls depicted at the site on Figure 4.5.6. Soil sampling indicates that PAHs are the driving contaminant in site soils, but arsenic, cadmium, chromium, lead, nickel, PCBs, tributyl tin, and DDT also significantly exceed both Portland Harbor screening level values and the range of levels considered “typical” for other industrial sites within Portland Harbor (DEQ, 2010). These contaminants are also of concern in area of potential concern 9A(D), just offshore of the site. While only a portion of the site stormwater is monitored under the 1200Z permit, recent permit monitoring data indicates screening level value exceedances of copper, zinc, cadmium, chromium and nickel. Due to lack of adequate characterization of all potential discharges from the site and data that indicates existing sources with on-going discharge of contaminants of concern for the adjacent sediment management area, DEQ recommends EPA consider the site to have a high potential for recontamination, until these pathways are adequately evaluated and addressed.

1913

NW Natural “Gasco” (ECSI # 84)

The NW Natural facility, also known as the Gasco site, is located on approximately 40 acres of land on the west side of the Willamette River at approximately river mile 6.5. The site is currently used by NW Natural for the processing and storage of liquefied natural gas. Portions of the site are leased for the storage of bulk petroleum and the bulk transfer of creosote oil and coal tar pitch. NW Natural (then known as Portland Gas & Coke) operated an oil manufactured gas plant and by-products refinery on the site between ~~1912~~ and 1956. These former operations produced wastes that included lampblack, spent oxide, and gas purifier that was managed in piles and ponds located in non-production areas of the site. Additionally, from 1913 to 1941, wastewater and tar waste from the onsite processes were discharged to low lying areas of the site with drainage features leading the river. These historical wastes are now collectively referred to as manufactured gas plant residuals. Site investigations conducted in the uplands and offshore areas of the site determined that hazardous substances associated with manufactured gas plant residuals impacted upland soils and groundwater that discharges to the river. These releases also resulted in contamination of the riverbank soil and the potential for stormwater to contact and carry contaminated soil to the river. Hazardous substances associated with the manufactured gas plant residuals include: PAHs, VOCs, SVOCs, metals and cyanide.

Riverbank Erosion: The potential for contaminated bank material to enter the river currently exists at the site. By agreement with EPA, measures to address riverbank contamination and erosion concerns will be integrated into the remedial design for the sediment remedy, completing upland source control

for this pathway. As evidenced by the similarity of contaminants in the bank with those in the adjacent river sediment, until the bank remedy is implemented, this pathway should be considered to have high potential for sediment recontamination.

Groundwater: To prevent the continued migration of contaminated groundwater to the river, DEQ required control and treatment of groundwater in the alluvium and fill water bearing zones. With input from EPA and the partners, DEQ approved planning and design of groundwater source control measures for the alluvium water-bearing zone in 2011. Construction of the groundwater extraction wells for the Alluvium water bearing zone were completed along the shoreline of the Gasco Site and the northern portion of the adjoining Siltronic property in 2013. The water treatment system was also constructed in 2013, which discharges treated groundwater to the Willamette River under an NPDES permit. The first phase of testing of the alluvium extraction and treatment system began in November 2013 and is nearing completion. The second phase of tested involves full-time full-scale operation and is anticipated to begin in late 2014 or early 2015. This portion of groundwater is considered controlled, pending effectiveness demonstration, with a low potential for sediment recontamination.

Planning for construction of a groundwater cutoff and collection trench is planned to address contamination in the fill water bearing zone. A plan and schedule is under development, but until measures are in place and demonstrated to be effective, this portion of groundwater at the site is considered uncontrolled. Due to the nature of the contaminants, discharge flow path and proximity to the river, sediment recontamination potential is considered high.

Stormwater and Overland flow: The majority of site stormwater infiltrates. Stormwater within the Koppers lease area is collected and discharged to the Columbia Boulevard Wastewater Treatment Plant under a City of Portland industrial discharge permit. Stormwater collected within the Pacific Terminals lease area is managed under a 1200Z NPDES permit which discharges to the Willamette River. DEQ is currently reviewing the stormwater and overland flow source control evaluation prepared by NW Natural for the Gasco site and additional controls and effectiveness monitoring may be needed and will be addressed in the final upland remedy. While technically considered uncontrolled until any needed measures are in place and effective, the stormwater pathway at the site was determined to be a low priority and it is anticipated that whether or not additional controls are warranted, the potential for recontamination due to stormwater is low.

Overwater acts: Marine fuel is pumped from barges to above-ground storage tanks on the Pacific Terminal Services leasehold via dockside pipelines. Coal tar is heated and pumped from ship to a dockside pipeline which is transferred to the Koppers leasehold. Standard best management practices and spill contingencies such as boom deployment are followed during product transfer. Because spills are anticipated to be infrequent and incidental and management practices are in place to prevent and respond to spills, DEQ considers this pathway controlled and the potential for recontamination is low.

Siltronic (ECSI # 183)

The Siltronic facility is located on approximately 15 acres of land on the west side of the Willamette River at approximately river mile 6.7. Siltronic purchased the site in 1978 and currently uses it for the fabrication of silicon wafers. Portland Gas & Coke owned the northern part of the property from 1939 until 1952, on which they stockpiled manufactured gas plant residuals and discharged wastewater and tar wastes to effluent ponds between approximately 1941 and 1956. Prior to 1978, extensive fill from upland sources and river sediment was placed on the site. In addition to these historical sources of contamination to groundwater, releases of chlorinated hydrocarbons from the effluent ponds, which periodically overflowed onto the current Siltronic property.

both recharges the
aquifer and

volatile organic compounds from a former underground solvent storage tank system used by Siltronic also contributed to contamination of groundwater occurring in the fill and underlying alluvium in the northern portion of the property. This contaminated groundwater discharges to the river.

Riverbank Erosion: The Siltronic riverbank is heavily armored with basalt, such that the potential for contaminated bank material to enter the river is low. By agreement with EPA, if measures to address riverbank contamination and erosion are necessary, they will be integrated into the remedial design for the sediment remedy, completing upland source control for this pathway. Bank contaminants are similar to those in adjacent river sediment, but erosion potential is currently low and sediment recontamination potential pending an integrated sediment remedy is also low.

. resulting in over 90% of the contaminant mass being destroyed.

Groundwater: DEQ, with input from EPA and the partners, approved an enhanced in-situ bioremediation program in 2008, which Siltronic implemented in the vicinity of the former tank system solvent release area. This interim measure consists of two steps: injection of a slurry of controlled release carbon and zero-valent iron, known as EHC™, into the subsurface; followed by injection of a commercial culture of dehalobacteria, called KB-1™. Initial source area treatment occurred in July 2009 and was expanded with a second treatment in June 2011. Performance monitoring of the effectiveness of the source area treatment is ongoing. The groundwater control and treatment system for the alluvium water bearing zone for the Gasco site extends onto the northern portion of the Siltronic site and intends to control and contain the groundwater impacted by manufactured gas plant residuals and solvent releases. Groundwater impacts south of the groundwater collection systems are low and the need for additional groundwater source control measures will be evaluated during review of the Siltronic site remedial investigation, which is expected to be completed in 2015. DEQ considers the alluvium and south portions of groundwater controlled, pending effectiveness demonstration, and that the potential for sediment recontamination is low. However, contamination in the fill water bearing zone at Gasco also extends onto the Siltronic property. A plan and schedule is under development for a groundwater cutoff and collection trench, but until measures are in place and demonstrated to be effective, this portion of groundwater at the site is considered uncontrolled. Due to the nature of the contaminants, discharge flow path and proximity to the river, sediment recontamination potential is considered high.

Stormwater: Site stormwater either infiltrates or is managed under the facility stormwater system which discharges to the river under an NPDES 1200Z industrial stormwater general permit. DEQ is currently reviewing the stormwater and overland flow source control evaluation report prepared by Siltronic. The stormwater pathway at the site was determined to be a low priority and it is anticipated that whether or not additional controls are warranted, the potential for recontamination due to stormwater is low.

Overwater acts: The facility does not conduct overwater activities so this pathway is, therefore, excluded.

Arkema (ECSE # 398)

The Arkema site, located on the west side of the Willamette River at river mile 7.2, is approximately 55 acres. Chemical manufacturing operations began at the site in 1941 by Pennsylvania Salt Manufacturing and ceased in 2001. The facility produced various chemicals including sodium chlorate, potassium chlorate, chlorine, sodium hydroxide, DDT, sodium orthosilicate, magnesium chloride hexahydrate, ammonia, hydrogen, sodium and ammonium perchlorate (rocket fuel) and hydrochloric acid. The manufacturing plant was subsequently demolished with the exception of the administrative building. The remedial investigation determined that site releases impacted upland and riverbank soil, groundwater and stormwater. Source control contaminants of

concern include: DDT and isomers, chlorobenzene, chloroform, perchlorate, hexavalent chromium, PCBs and dioxins/furans. DEQ determined that contaminant levels in groundwater, stormwater discharging to the Willamette River and potentially erodible riverbank soils required source control measures.

Groundwater: DEQ, with input from EPA and the partners, approved the selected partial remedy in 2009. Construction of a 1,700 lineal foot soil-bentonite slurry groundwater cutoff wall was completed in October 2012, the configuration of which is shown on Figure 4.5.6. The wall is up to 88 feet deep and in contact with basalt bedrock. Construction of a system to collect and treat groundwater landward of the cutoff wall was completed in 2013. Startup testing of the groundwater collection and treatment system began in 2014. Groundwater migrating to the Willamette River outside of the groundwater barrier wall containment system remains as a medium priority for source control. Remedial alternatives to address these groundwater plumes will be evaluated in either the Arkema or Rhone Poulenc upland feasibility studies, which are expected to be completed in 2015. Because a plan and schedule for the remainder of groundwater source control is not available at the time of this report, a portion of the groundwater pathway is considered uncontrolled. As evidenced by the similarity of contaminants in groundwater to those in river sediment adjacent to the plume's interface with the river, the potential for sediment recontamination from groundwater is medium.

Overwater acts: While historical docks allowed extensive overwater activities at the site, these activities ceased prior to cleanup investigation and the site is currently vacant. Therefore, the overwater acts pathway was excluded.

The Schnitzer Investment Doane Lake site is an undeveloped 3.5 acre site located approximately 1,500 feet inland from the west side of the Willamette River at river mile 7.2. During the early 1970s and possibly late 1960s, the northeast portion of the site was filled with auto shredder residue, which is composed largely of plastic, rubber, glass, foam and non-ferrous metals and contaminated with PCBs. Because of the potential for

contaminated stormwater runoff into the City of Portland's outfall basin 22B stormwater system in NW Front Avenue, the site is a medium priority and DEQ selected a source control measure for the site in 2013. This measure includes a one-foot soil cap over the area where shredder residue is present, along with institutional controls. Cap construction began in the summer of 2014. Stormwater from the site is considered controlled, pending effectiveness demonstration, and the potential for sediment recontamination by stormwater is low.

Rhone Poulenc (ECI # 155)

, PCBs

The Rhone Poulenc site is an 18-acre property approximately 2,000 feet inland from the west side of the Willamette River at river mile 7. The site operated as a pesticide and herbicide manufacturing and formulation facility from 1943 to 1990. Process wastewater and stormwater was discharged to Doane Lake until 1966, and to the nearby Willamette River starting in 1966. Various process and stormwater treatment systems have been implemented over this timeframe. Spills, leaks, and other releases also occurred at the site. Contaminants of concern include chlorinated pesticides and herbicides, chlorinated benzenes, volatile and semi-volatile organic compounds, metals and dioxin/furans. Upland and in-river site investigations concluded that operational releases of hazardous substances have impacted site soils, stormwater and groundwater. Contaminated groundwater plumes from the site extend to and actively discharge to the Willamette River. Both the stormwater and groundwater pathways are medium priority for source control.

Riverbank Erosion: Site waste discharges to the former Doane Lake flowed through an historical drainage ditch and onto the riverbank at an area close to the City of Portland Outfall 22B and immediately adjacent to the northern edge of Arkema riverbank (see Figure 4.5.6). Soil samples collected showed significant exceedances of the JSCS screening level values for SVOCs, VOCs, dioxin/furans, chlorinated pesticides and herbicides, PCBs and metals in the ditch and for chlorinated pesticides and herbicides, PCBs and molybdenum below the ditch discharge point. Therefore, riverbank soil below the historical drainage ditch outlet represents a high potential for recontamination and should be considered by EPA in the design of the in-water remedy for the adjacent sediment management area.

Groundwater: Contaminants in groundwater associated with the site exceed several screening level values at riverbank monitoring wells and transition zone water sample locations. While ranked as a medium priority, DEQ is not requiring an interim control because the contaminants of concern have low organic carbon-water partitioning coefficients, which lowers the likelihood of sediment recontamination. DEQ is requiring the plume to be addressed in the upland feasibility study. Beginning in 2006, Rhone-Poulenc worked to seal and line portions of the City of Portland's outfall basin 22B stormwater lines to prevent infiltration and facilitated transport of contaminated groundwater to the Willamette River. Effectiveness monitoring is scheduled to start as soon as lining quality assurance issues are resolved. A comprehensive plan to control groundwater discharge to the Willamette River will be evaluated in the site feasibility study, which is expected to be complete in 2015. Because a plan and schedule for groundwater source control is not available at the time of this report, the groundwater pathway is considered uncontrolled. As evidenced by the similarity of contaminants in groundwater to those in river sediment adjacent to the plume's interface with the river, the potential for sediment recontamination from groundwater is medium.

, including groundwater that crosses beneath the Arkema property,

Stormwater: Stormwater primarily either infiltrates on-site or is collected and routed to the facility wastewater treatment plant, which discharged treated groundwater and stormwater to the Willamette River under an individual NPDES permit from 2009 through 2013. However, some stormwater migrates off-site along the property boundary with Metro, NW 61st and Hwy 30. Until additional controls are

implemented, the stormwater pathway is considered uncontrolled and the potential for sediment recontamination from stormwater is medium.

Gould Electronics, Inc. aka GA-TEK (ECSI #49)

EPA initiated investigation and cleanup of this former smelting, refining and lead-acid battery recycling site under a Unilateral Order issued in 1992. Air, soils, groundwater, and surface water were evaluated and remediation completed in 2000 included soil excavation to an 8.5 acre onsite containment facility, filling of East Doane Lake, wetlands mitigation, groundwater monitoring and institutional controls. The site is currently undeveloped, with no direct transport pathways to the river and leachate monitoring through 2010 indicates no significant issues. Therefore, DEQ considers the potential for recontamination of the river from this site to be low.

Metro Central Transfer Station (ECSI # 1398)

The Metro site is approximately 10.4 acres and is approximately 2,000 feet inland from the west side of the Willamette River at river mile 7.4. A succession of steel companies operated on the site from 1924 until 1989 when it was redeveloped as a solid waste transfer station. Metro has completed a source control evaluation and DEQ issued a source control decision June 30, 2014.

Stormwater: Site stormwater discharges to the City of Portland's outfall basin 22B system under a 1200Z permit. Stormwater monitoring data indicate that implementation of best management practices has resulted in significant reductions in all contaminants. However, consistent permit benchmark exceedances of metals require engineered treatment of stormwater leaving the site by 2015, which will further enhance stormwater source control. Stormwater from the site is considered controlled, pending effectiveness monitoring, and sediment recontamination potential as a result of stormwater from the site is considered low.

Groundwater: Groundwater beneath the site is being evaluated as part of the Rhone Poulenc remedial investigation and feasibility study. No significant groundwater releases attributable to the Metro facility have been identified.

TPH, PAHs



CertainTeed Roofing Products/GS Roofing (ECSI # 117)

The CertainTeed Roofing Products facility (formerly GenStar or GS Roofing or Bird) covers approximately 3 acres located on the west side of the Willamette River at river mile 7.3. Facility operations have included the manufacture of residential and commercial building asphalt shingles for the past 80 years. Site development included the riverward expansion of the upland area with the placement of industrial fill such as off-spec roofing material. Contaminants associated with the production of roofing and site fill include ~~oil~~ TPH, nickel, copper, zinc and lead.

Riverbank Erosion: Characterization of the riverbank detected contaminants above JSCS screening levels values. By agreement with EPA, measures to address riverbank contamination erosion concerns will be integrated into the remedial design for the sediment remedy, completing upland source control for this pathway. Because of the steepness of the riverbank, its heterogeneous composition, uncertain resistance to erosion and limited near shore sediment data, DEQ considers the potential for sediment recontamination to be medium.

Groundwater: Groundwater characterization indicates low level exceedances of JSCS screening levels in groundwater in the industrial fill area. A scope-of-work for additional characterization and evaluation is in development. Because characterization is incomplete, a final determination as to the need for groundwater source control or a plan and schedule for control cannot be completed. Therefore, the

groundwater pathway at this site is considered uncontrolled and the potential for sediment recontamination is considered low.

Stormwater and Overland flow: Stormwater is discharged to the Willamette under a 1200Z general permit. Characterization of catch basin solids and stormwater has been completed per the JSCS. In 2013, the facility removed historical solids from the storm lines to the extent practical and implemented best management practices, such as sweeping and covering outside operation areas. Monitoring to determine the effectiveness of these measures is ongoing and additional measures may be needed. Given that efforts are underway to monitor and adaptively control stormwater, DEQ considers the pathway controlled, pending effectiveness demonstration, and the potential for sediment recontamination is low.

Overwater acts: The facility does not conduct overwater activities or have overwater structures where these could occur. Therefore, the overwater acts pathway was excluded.

Willbridge Bulk Fuel Terminals (EC SI # 1549)

The Willbridge Bulk Fuel Terminals project is comprised of three separate terminals, Kinder Morgan, Chevron USA and Phillips 66 (Conoco Phillips) and is located on the west side of the Willamette River at river mile 7.5 to 7.7. The terminals have been used for petroleum storage and distribution operations from 1914, 1911 and 1908, respectively. In 1994, DEQ issued a joint order to the three terminals to conduct a remedial investigation and feasibility study. The remedial investigation was completed in 2003 and subsequent work has focused on source control implementation at the terminals.

The **Kinder Morgan Willbridge Terminal (EC SI # 160)** facility consists of approximately 37 acres.

Riverbank Erosion and Overland flow: Characterization of potentially erodible portions of the riverbank did not identify source control concerns, so this pathway was excluded. However, components of the pesticide DDT were detected in a small isolated beach area under the dock, which requires removal. ~~Kinder Morgan is preparing a plan to complete the removal in 2015 with DEQ oversight.~~ Although DDT is also found in the adjacent river sediments, due to the small area targeted for removal, sediment recontamination potential is considered medium until removal is completed.

see deletions

repaired

Groundwater: DEQ has been tracking the groundwater pathway as a medium priority because of the low level screening level value exceedances of PAHs and metals in monitoring wells near the river. ~~during 2009, Kinder Morgan patched~~ portions of the Saltzman Creek concrete flume where groundwater was entering the flume. This effort has successfully controlled this preferential migration of impacted groundwater to the Willamette. There are no current groundwater source control measures operating other than routine monitoring and maintenance of interim spill response actions. DEQ considers this pathway controlled, pending effectiveness demonstration and the potential for sediment recontamination by groundwater from the site is considered low.

Stormwater and Overland flow: Stormwater at the site discharges to the Willamette River under a 1200Z general stormwater permit, with best management practices including oil/water separators, catch basins, and strip drains applied to reduce solids and operational pollutants in discharge. A stormwater source control evaluation report was prepared in December 2013 and is in review by DEQ. Additional source control measures will be implemented, if needed, and

in 2007, 2008, 2009, and 2014.

measures are warranted and the potential for sediment recontamination from groundwater at the site is low.

Stormwater and Overland flow: Site stormwater discharges to the river under a 1200Z general stormwater permit. The facility implemented a number of stormwater best management practices in 2012 and 2013. No additional measures are recommended and the potential for sediment recontamination from stormwater from the site is low.

Overwater acts: Spills from overwater activities at this facility are anticipated to be incidental, minor and infrequent, so the pathway was not specifically called out as part of the source control process. However, McCall Oil employs overwater source control measures for product transfers on the dock areas to prevent discharge of materials to the river. Practices and controls employed are described in the site's Oil Spill Contingency Plan and DEQ's Emergency Response Section reviews and approves the plan and works with the facility to ensure regulatory compliance. Given the on-going adaptive management of overwater activities through the plan, DEQ considers this pathway controlled.

Doane Lake/Willbridge Georegion Recontamination Potential Conclusions – The Doane Lake/Willbridge georegion has a long history of industrial use and many on-going industrial operations. The significant levels and types of contaminants found at elevated concentrations in the river sediment within this georegion are consistent with the documented direct discharges of hazardous substances at high volumes, high concentration and long durations from upland sources to the river. Since direct discharges of contaminants have ceased, the driving source control concerns in the georegion are related to groundwater and bank erosion and, to a lesser extent, stormwater. Of the 16 sites investigated, all potential pathways at three sites were excluded. Due to pathway exclusions, removals and other source control actions, 13 of the 18 total sites have a low potential for sediment recontamination.

The contaminated fill in the water-bearing zones that extends across portions of the Gasco and Siltronic sites likely has a low to medium potential to recontaminate remediated in-water sediment, but presents a high risk to Willamette River receptors until it is controlled. DEQ anticipates implementation of the planned cutoff and collection trench to effectively reduce sediment recontamination potential and unacceptable risk to river receptors, associated with the contaminated fill on those sites.

The portion of the Arkema groundwater plume outside of the newly constructed hydraulic containment system and the Rhone Poulenc groundwater plume and stormwater pathway have a medium potential for sediment recontamination. DEQ expects remedies to be implemented for all three prior to or in conjunction with the in-water remedy, further reducing their recontamination potential.

DEQ anticipates that effective bank remedies will be integrated into the in-water remedy at Arkema, Rhone Poulenc, Certainteed (GS Roofing), NW Natural (Gasco) and Siltronic. Until the in-water remedy is implemented integrating these banks, the potential for sediment recontamination is low at Siltronic, medium at GS Roofing and high at Arkema, Rhone Poulenc and Gasco.

Investigations of the stormwater pathway at US Moorings and groundwater pathway at Certainteed (GS Roofing) are incomplete at the time of this report. As evidenced by the type and nature of the contaminants at the sites and in the adjacent river sediment, the US Moorings and Certainteed sites present a ~~medium~~ and low potential respectively for sediment recontamination.

high

see pp. 52, 54

Stormwater: Based on results of stormwater and stormwater solids sampling, DEQ determined that source control measures were needed in select sub-basins. Pipeline cleaning and other management practices were implemented and performance monitoring, with additional management practices as indicated, is being implemented. Given the efforts underway at adaptive management, DEQ considers the stormwater pathway at the site controlled, pending effectiveness demonstration, and the sediment recontamination potential is low.

Overwater Activities: Overwater activities at the site consist primarily of transfer of soda ash. Spill prevention and response procedures are in place, in the event of an infrequent, incidental spill. Therefore, the pathway is considered insignificant and was excluded.

see deletion

As early as 1906,

Port of Portland Terminal 4 Slip 3 (ECSI # 272)

The 23-acre site is located on the east bank of the Willamette River at approximately river mile 4.6. Union Pacific Railroad ~~owned the facility as early as 1906 and~~ operated a petroleum pipeline and dock used to transfer diesel and oil from marine vessels to storage tanks at the UPRR St. Johns Tank Farm. The City of Portland Commission of Public Docks purchased the property in 1917 and granted UPRR (and subsequently Chevron, starting in 1969) an easement for the continued use of the pipeline and dock. The Port acquired the property in 1971 and petroleum transfer and storage operations ceased in 1983. Diesel releases from the pipeline resulted in petroleum seeps in Slip 3. Currently, the primary tenant activity is bulk material transfer to boats, such as soda ash at the Kinder Morgan facility. Source control contaminants of concern include PAHs and arsenic.

1969

Overland Flow: In 2009, two small, contiguous areas of PAH-contaminated surface soil were removed from the top of bank at Slip 3, disposed off site, and backfilled with clean fill. Two additional small areas of PAH-contaminated surface soil near the Slip 3 top of bank also require source control measures. Because these areas do not appear to be erosional, they will be addressed at the time of the in-water remedy. Until additional measures are implemented, the overland flow pathway is considered uncontrolled. Therefore, sediment recontamination potential remains medium until measures are implemented.

Riverbank Erosion: In 2004, approximately 4,400 cubic yards of the riverbank material at the head of Slip 3 was removed and replaced with organoclay amended clean fill to address a petroleum contaminant seep from a historic upland subsurface pipeline release. Groundwater monitoring wells within the seep pathway through the amended fill and visual observation of the riverbank indicate that this migration pathway is no longer complete. The current sediment recontamination potential from bank erosion at the site is low.

Groundwater: Light non aqueous phase liquids resulting from the diesel pipeline release has been removed from upland wells since 2003. LNAPL recovery rates have diminished, but LNAPL recovery and groundwater monitoring will continue, including sentinel wells in the amended riverbank soil. Therefore, the groundwater remedy appears to be successful, and the sediment recontamination potential due to groundwater at the site is low.

1993

Stormwater: Based on results of stormwater and stormwater solids sampling, DEQ determined that source control measures were needed in select sub-basins. Pipeline cleaning and other management practices were implemented and performance monitoring, with additional management practices as indicated, is being implemented. Given the efforts underway at adaptive management, DEQ considers the stormwater pathway at the site controlled, pending effectiveness demonstration, and the sediment recontamination potential is low.

diesel/biodiesel

		Overwater acts	Low	Excluded		
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Kinder Morgan Linnton Terminal (GATX) (ECIS # 1096)

The Kinder Morgan Linnton Terminal (formerly known as the GATX terminal) is located between river mile 4 and 5 on the west bank of the Willamette River and covers approximately 17 acres. Petroleum products storage and transfer has occurred at the site since the early 20th century, as well as drum painting and storage, distribution of vehicle tires and distribution of bulk and canned goods to areas service stations. The facility currently stores gasoline, diesel, ~~XXXXX~~ and ~~XXXXX~~ on site in 33 above ground storage tanks with the total estimated capacity of 20,000,000 gallons. Fuels are offloaded from barges and ships via a dock facility and tanks are connected the Olympic and SFPP-LP pipelines. The facility also has four warehouses, a maintenance shop, administrative offices, parking lots, ~~XXXXXX~~ truck and rail loading racks. The stormwater and groundwater pathways are the primary pathways of concern for the Willamette River and the contaminants of concern for those pathways are metals, TPH, PAHs, VOCs ~~and PCBs~~.

and

. Tanker

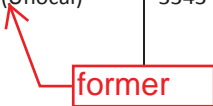
were taken out of service in 2000-2001.

Bank Erosion: The bank line at the site consists of a wooden bulkhead wall about 10-12 feet above the rip rap lined beach. These structures prevent bank erosion, with the exception of the exposed beach at the water line. A small area of subsurface petroleum contamination was identified on the beach in an area where petroleum sheen has previously been observed. DEQ is evaluating the results of a leaching potential evaluation and pore-water sampling of beach contamination, which is being considered by EPA for integration into the in-water remedy. Controls for bank erosion are not needed, so this upland pathway is anticipated to be excluded.

Groundwater: A plume of LNAPL, petroleum hydrocarbons and associated dissolved constituents was identified in the southern and riverward portion of the site. Historically, petroleum sheens were intermittently observed in the river at this shoreline area and were managed with floating absorbent containment booms. In 2004, Kinder Morgan installed a series of groundwater/LNAPL recovery wells along the bulkhead support wall between the tank farm and the southern shoreline area. The recovery system operated and was upgraded over the years and in 2012, Kinder Morgan installed a barrier wall and a new set of recovery wells to contain and continue removing LNAPL. The wall is approximately 220 feet long by 30 to 33 feet deep and the system also provides some groundwater containment and treatment around the wall. Adaptive management and effectiveness monitoring are anticipated to demonstrate that the highest priority portion of the groundwater pathway is controlled and whether additional controls are necessary for the remaining portions of site groundwater. The potential for sediment recontamination due to the petroleum constituents in groundwater at the site is considered low.

Stormwater: Stormwater from the site discharges to the beach through three outfalls covered under the facility's NPDES 1200Z industrial stormwater general permit. Best management practices implemented at the site include: oil-water separators; sealing of metallic roof tops; catch basin repair and cleaning; and increased system inspection frequency. Stormwater sampling data indicate that metals moderately exceed screening level values and additional or enhanced best management practices are anticipated. DEQ considers stormwater at the site controlled, pending effectiveness demonstration, and the potential for sediment recontamination due to metals in stormwater is considered low.

Overwater Activities: Kinder Morgan's overwater activities at the site consist primarily of dock maintenance and petroleum transfer via tanker ships and on the dock lines connected to the tank farm. As part of the source control process, Kinder Morgan is preparing a plan describing overwater practices and controls that are implemented to prevent low-frequency incidental spills, as described in the site's

		Stormwater Overwater acts	High Low	Treatment/BMPs 2010 Excluded		
Consolidated Metco	3295	Groundwater Stormwater	Med Med	Excluded Cleanout/repair 2010, redevelopment with new SW system 2012-2013	NFA 2011 SCD anticipated 2015	Low
Ash Grove Cement	4696	Overland flow Bank erosion Groundwater Stormwater Overwater acts	Low Low Low Low Low	Needs investigation – quick lime Needs investigation – quick lime Excluded Needs investigation – quick lime Needs investigation	SASR* 2009 Not currently in program	Low
Port of Portland Tract O Property	5307	Overland flow Bank erosion Groundwater Stormwater Overwater acts	Low Low Low Low Low	Excluded Excluded Excluded Excluded Excluded	NFA 2010	Low
JR Simplot (Unocal) 	3343	Overland flow Bank erosion Groundwater Stormwater Overwater acts	Low Low Low Low Low	Needs investigation Needs investigation ECSI 1982 ammonia cleanup & 2002 diesel spill cleanup Needs investigation Needs investigation	Not currently in program	Low

*Site Assessment Strategy Recommendation


Oregon Steel Mills (Evraz) (ECSE # 141)

The site is situated on the eastern bank of the Willamette River at approximately river mile 2 and consists of approximately 145 acres. The site historically manufactured steel slabs, plates, coils, and spiral weld pipe from scrap metal and currently uses purchased steel slabs to produce the same products. Environmental investigations conducted at the site beginning in 2002 revealed the presence of PCBs, metals (chromium, manganese, lead and arsenic), PAHs, and TPH at elevated concentrations in upland site soils; metals and PCBs at elevated concentrations in shoreline and beach soils; and arsenic and manganese in groundwater along the shoreline of the site.

Bank Erosion: DEQ selected a shoreline source control action for the site that includes: removal of soil hot spots to the extent feasible; disposal of excavated soil at a permitted facility; and stabilization with geotextile, sand, large and small rock, and vegetation along approximately 1,700 feet of shoreline. The placement of materials is intended to contain any residual low-level contamination and prevent erosion. DEQ anticipates this action will be implemented beginning in the Spring of 2015 and effectiveness will be demonstrated through a long-term monitoring plan to ensure the shoreline remains stable and adequately vegetated. Until the bank action is implemented and demonstrated to be effective, the pathway is considered uncontrolled and with a high potential for sediment recontamination.

Groundwater: Based on concentrations of manganese and arsenic detected in shoreline wells in the range of background levels, generally declining concentrations in shoreline monitoring wells when compared to upland wells, and the absence of associated adverse impacts to aquatic species in the river, DEQ determined that no source control measures were needed to control groundwater impacts. Further evaluation of this pathway is planned after completion of the riverbank remedy, but the potential for sediment recontamination due to arsenic and manganese in shoreline groundwater is considered low.

Stormwater: In December 2010, DEQ selected a stormwater source control action for the site that includes: removal of localized areas of contaminated soil, paving areas where feasible, and treatment for the majority of stormwater leaving the facility by bioswales, sand filters and a very large collection and clarification basin. The effectiveness of the clarification basin is under evaluation and design modifications are likely. Given the efforts

			Groundwater Overwater acts	Low Low	
Ash Grove Cement	4696	Rivergate	Overland flow Bank erosion Stormwater Overwater acts	Low Low Low Low	Investigation needed, but due to benign nature of potential contaminant (quick lime), low priority and recontamination potential – Not currently in DEQ Cleanup program
JR Simplot (Unocal) 	3343	Rivergate	Overland flow Bank erosion Stormwater Overwater acts	Low Low Low Low	Investigation needed, but due to lack of significant releases, low priority and recontamination potential – Not currently in DEQ Cleanup program
Oregon Steel Mills	141	Rivergate	Bank Erosion	High	Plan implementation 2015-16 – high recontamination potential
ODOT Outfalls/Roadways	5437	multiple	Stormwater	High	SCM plan implementation 2015-16 – medium recontamination potential

4.8.2 Bank Areas Needing Evaluation and/or Remedy

Under the JSCS and subsequent discussions with EPA, DEQ is to complete riverbank source control evaluations for all riverfront sites in the DEQ Cleanup Program. DEQ and EPA agreed to subdivide into two categories riverbanks where the evaluation concluded that there is potential for the riverbank to be a source or that the riverbank requires a source control measure.

1. Riverbanks not adjacent to a sediment area anticipated to require an in-water sediment remedy.
2. Riverbanks adjacent to a sediment area anticipated to require an in-water sediment remedy.

For those riverbanks that are not adjacent to an anticipated sediment remediation area, DEQ will evaluate remedial options for the riverbank, select the riverbank source control measure and work with the responsible party to design, permit and construct the riverbank source control measure. For those riverbanks adjacent to an anticipated sediment remedy area, DEQ will, in most cases, refer the site to EPA so that the recontamination evaluation, remedial design, permitting and construction can be integrated with the in-water sediment remedy. DEQ can at its discretion require additional measures including construction of riverbank remedial measures at sites adjacent to identified sediment remedy areas. Table 4.8.2 identifies the riverbanks that DEQ is referring to EPA for further action and integration with the in-water remedy.

Table 4.8.2 Riverbanks Referred to EPA for Integration with In-River Remedy				
SITE	ECSI #	GEOREGION	ACTION NEEDED	RECONTAMINATION POTENTIAL
Glacier NW	5449	Albina	SCMs needed – integrate w/in-water remedy	Low
US Navy Reserve	5109	Swan /Mocks	Investigation needed	Medium
Port of Portland (OU1)	271	Swan /Mocks	SCMs needed – integrate w/in-water remedy	Medium
Hampton Lumber	5761	Guilds Lake	Confirm during design if SCM needed	Medium
Glacier Northwest Inc.	2378	Guilds Lake	Confirm during design if SCM needed	Medium
Gunderson	1155	Guilds Lake	SCMs needed – integrate w/in-water remedy	High
Willamette Cove	2066	St. Johns	SCMs needed – integrate w/in-water remedy	Medium
NW Natural Gasco	84	Doane/Will	SCMs needed – integrate w/in-water remedy	High
Siltronic	183	Doane/Will	SCMs needed – integrate w/in-water remedy	Low
Rhone Poulenc	155	Doane/Will	SCMs needed – integrate w/in-water remedy	High